

CHAPTER 33

Laser for repigmenting vitiligo

Thierry Passeron and Jean-Paul Ortonne

The use of lasers in vitiligo is usually dedicated to the depigmentation of residual pigmented areas in generalized forms [1,2] or to remove achromic epidermis before grafting [3,4]. In the past few years, new laser devices have been reported for repigmenting vitiligo lesions. First of them, the 308-nm excimer laser combined the selectivity of lasers and the well recognized efficacy of ultraviolet (UV) B for treating vitiligo. Although less investigated, the 632.8-nm helium–neon laser brings an innovative approach to treat vitiligo lesions.

308-nm excimer laser

The xenon chloride XeCl excimer laser generates UVB radiation at a wavelength of 308-nm. Several reports have shown that this device is effective in the treatment of vitiligo. Patients are treated 2 or 3 times a week for 1–6 months depending on series. Low fluencies ($50\text{--}200\text{ mJ/cm}^2$) are used. In most studies, the percentage of treated lesions achieving at least 75% repigmentation is about 30% [5–9]. As for the different phototherapies, the rate of repigmentation varies depending on the anatomic sites. The rate of repigmentation is very high on UVB responsive areas such as the face whereas the extremities and bony prominences (well-recognized UVB-resistant areas) show a statistically significant inferior repigmentation rate [9] (Figs. 33.1–33.3). Sessions can be performed 1, 2, or $3 \times$ weekly as repigmentation seems to depend on the total number of treatments, not their frequency [10]. The stability of the repigmentation with time has so far been difficult to evaluate, as follow-up of the studies is poor or nil; however, one recent series showed an absence of depigmentation of the treated lesions after 1 year [8]. Side effects are limited to mild

erythema and uncommon blistering. The major advantage of the XeCl excimer laser is to confine the treatment only on the vitiliginous lesions. A pilot intra-individual comparative trial recently shows that the 308-nm excimer laser is more effective than narrowband UVB (NB-UVB) with more rapid and profound repigmentation [11]. These results need to be confirmed in a larger series but the XeCl excimer laser does represent a useful tool for the treatment of localized vitiligo. It gives the possibility to choose only a limited number of lesions without whole body irradiation.

Combination of the 308-nm excimer laser and topical tacrolimus has also provided interesting results but further follow-up are still required (cf. Chap Medical treatment of vitiligo) [12,13]. Moreover, UVB phototherapy has already shown its efficacy after grafting [14]; the selectivity of the 308-nm excimer laser would be very useful in such indication and this combination worth to be further investigated.

632.8-nm helium–neon laser

Another laser, the 632.8-nm helium–neon laser, was also reported being able to induce a repigmentation in segmentary vitiligo [15]. In vitro studies showed that this laser increased the proliferation, and then the migration of the melanocytes. Thirty patients were treated once or twice weekly. A repigmentation of at least 75% was obtained in 20% of the patients. No side effect was noted. However, the average number of sessions needed to achieve these interesting results is very high (137 sessions, i.e. 1–2.5 years of treatment). Nevertheless, the 632.8-nm helium–neon laser represents a completely innovative therapeutic approach which is worth studying.

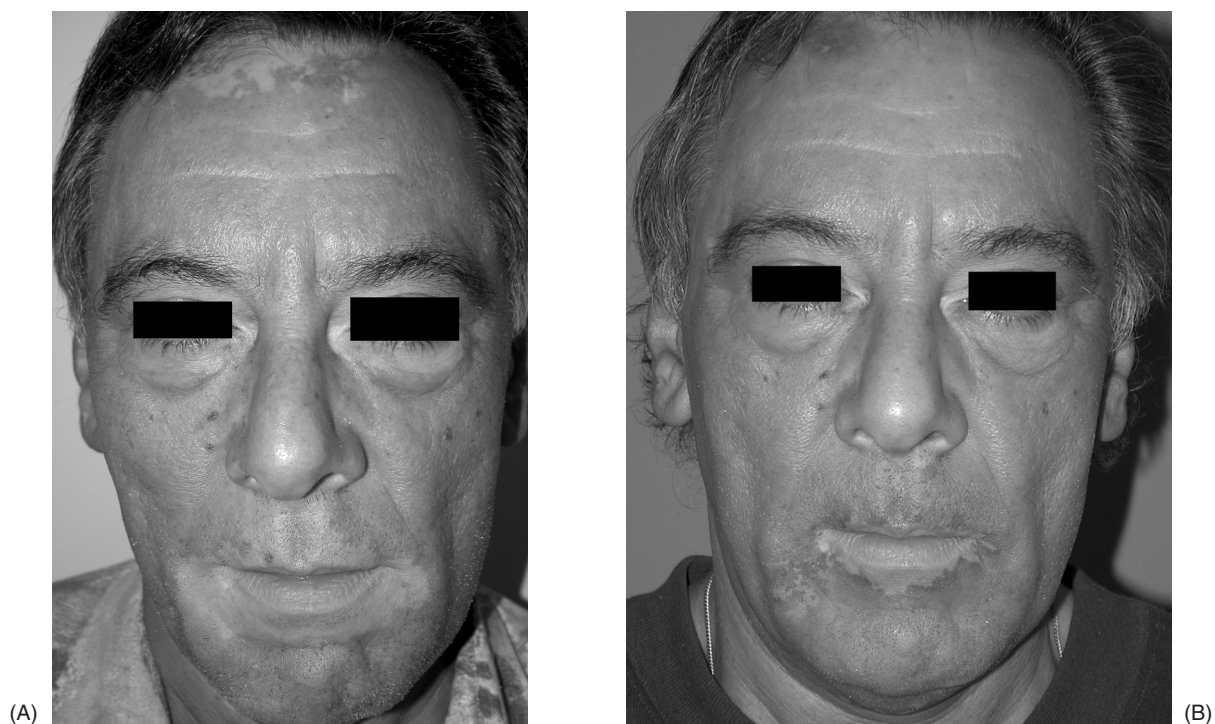


Fig. 33.1 Vitiligo of the face (A) before treatment, (B) 1 month after 24 sessions of 308 nm excimer laser.

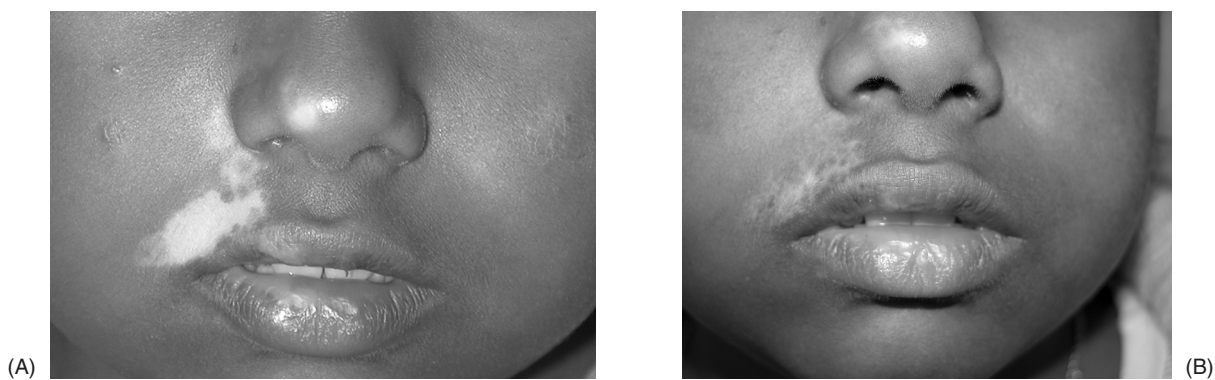


Fig. 33.2 Segmental vitiligo (A) before treatment, (B) 1 month after 24 sessions of 308 nm excimer laser.

Conclusion

New laser devices can now be used to repigment vitiligo patches. The efficacy and good tolerance of the 308-nm excimer laser is now demonstrated in several prospective studies and the US Food and Drug Administration (FDA) has approved this laser for the treatment of vitiligo. Although very interesting,

the results obtained with the 632.8-nm helium–neon laser still need to be further investigated. One of the main advantages of these two new devices is to treat selectively the vitiligo lesions with sparing of the surrounding healthy skin. This selectivity also limits their use to vitiligo involving less than 20% of the total surface body area. Indeed, these lasers

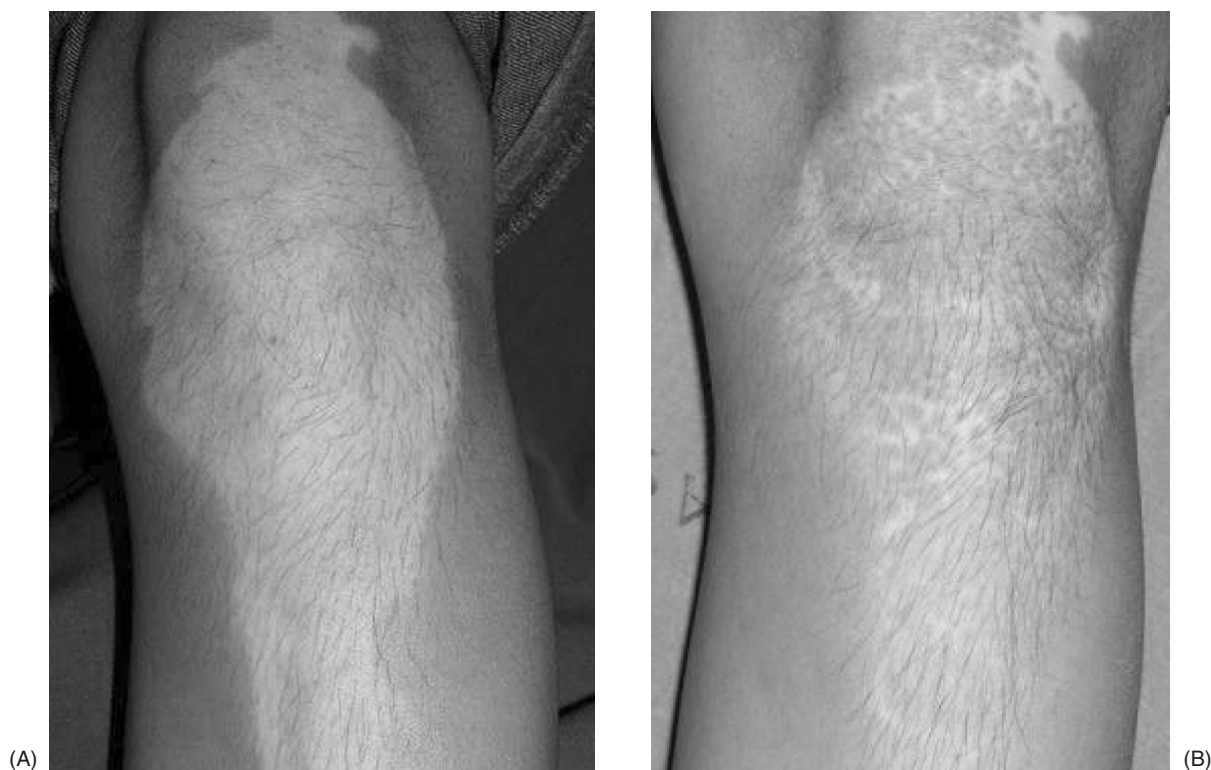


Fig. 33.3 Vitiligo of the leg and knee (A) before treatment, (B) After 30 sessions of 308-nm excimer laser combined with twice daily applications of 0.1% of tacrolimus ointment.

should not be opposed to other treatments, such as phototherapy, but should be considered as new complementary options that could be possibly associated with topical treatments or surgical grafts.

References

- 1 Kim YJ, Chung BS, Choi KC. Depigmentation therapy with Q-switched ruby laser after tanning in vitiligo universalis. *Dermatol Surg* 2001;**27**:969–70.
- 2 Rao J, Fitzpatrick RE. Use of the Q-switched 755-nm alexandrite laser to treat recalcitrant pigment after depigmentation therapy for vitiligo. *Dermatol Surg* 2004;**30**:1043–5.
- 3 Acikel C, Ulkur E, Celikoz B. Carbon dioxide laser resurfacing and thin skin grafting in the treatment of “stable and recalcitrant” vitiligo. *Plast Reconstr Surg* 2003;**111**:1291–8.
- 4 Guerra L, Primavera G, Raskovic D, et al. Erbium:YAG laser and cultured epidermis in the surgical therapy of stable vitiligo. *Arch Dermatol* 2003;**139**:1303–10.
- 5 Spencer JM, Nossa R, Ajmeri J. Treatment of vitiligo with the 308-nm excimer laser: a pilot study. *J Am Acad Dermatol* 2002;**46**:727–31.
- 6 Baltas E, Csoma Z, Ignacz F, Dobozy A, Kemeny L. Treatment of vitiligo with the 308-nm xenon chloride excimer laser. *Arch Dermatol* 2002;**138**:1619–20.
- 7 Taneja A, Trehan M, Taylor CR. 308-nm excimer laser for the treatment of localized vitiligo. *Int J Dermatol* 2003;**42**:658–62.
- 8 Esposito M, Soda R, Costanzo A, Chimenti S. Treatment of vitiligo with the 308 nm excimer laser. *Clin Exp Dermatol* 2004;**29**:133–7.
- 9 Ostovari N, Passeron T, Zakaria W, et al. Treatment of vitiligo by 308-nm excimer laser: an evaluation of variables affecting treatment response. *Lasers Surg Med* 2004;**35**:152–6.
- 10 Hofer A, Hassan AS, Legat FJ, Kerl H, Wolf P. Optimal weekly frequency of 308-nm excimer laser treatment in vitiligo patients. *Br J Dermatol* 2005;**152**:981–5.
- 11 Hong SB, Park HH, Lee MH. Short-term effects of 308-nm xenon-chloride excimer laser and narrow-band

258 Chapter 33

- ultraviolet B in the treatment of vitiligo: a comparative study. *J Korean Med Sci* 2005;**20**:273–8.
- 12 Kawalek AZ, Spencer JM, Phelps RG. Combined excimer laser and topical tacrolimus for the treatment of vitiligo: a pilot study. *Dermatol Surg* 2004;**30**:130–5.
- 13 Passeron T, Ostovari N, Zakaria W, et al. Topical tacrolimus and the 308-nm excimer laser: a synergistic combination for the treatment of vitiligo. *Arch Dermatol* 2004;**140**:1065–9.
- 14 Pianigiani E, Risulo M, Andreassi A, Taddeucci P, Ierardi F, Andreassi L. Autologous epidermal cultures and narrow-band ultraviolet B in the surgical treatment of vitiligo. *Dermatol Surg* 2005;**31**:155–9.
- 15 Yu HS, Wu CS, Yu CL, Kao YH, Chiou MH. Helium–neon laser irradiation stimulates migration and proliferation in melanocytes and induces repigmentation in segmental-type vitiligo. *J Invest Dermatol* 2003;**120**:56–64.